

1.

- a. A filamentary loop in the shape of an  $n$ -gon, that is to say, a regular polygon of  $n$  sides. Show that the centre of the polygon has

$$H = \frac{nI}{2\pi r} \sin \frac{\pi}{n}$$

where  $r$  is the radius of the circle circumscribing the polygon.

- b. Find  $H(n)$  for  $1 \leq n \leq 15$  and tabulate the results. Then plot the graph of  $H$  against  $n$  and give a brief discussion. (Assume, for example,  $I = 1\text{A}$  and  $r = 1\text{m}$ .) [20]